

Publication Measurement Error in Benefit Transfers

Randall S. Rosenberger
Oregon State University

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Overview

I. Introduction

- Accuracy of Benefit Transfers

II. Sources of Error

- Generalization Error
- Measurement Error
- Publication Selection Bias

III. Recommendations

I. Introduction

■ Benefit Transfer

- Information or Knowledge Transfer

- Study Site ⇒ Policy Site

- Methods

- Value Transfers

- Function Transfers

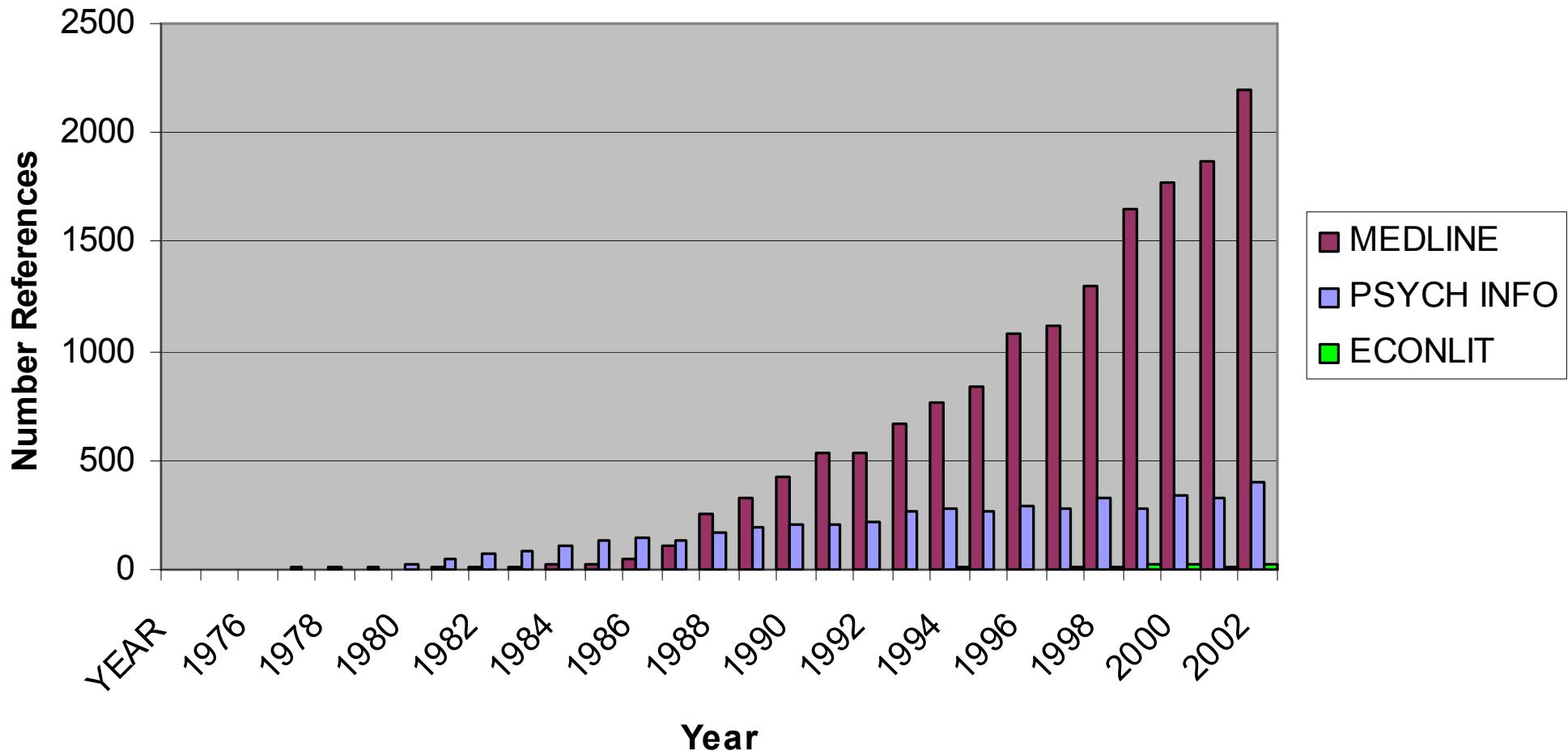
Introduction

■ Meta-Analysis Transfer Function

- Statistical analysis of previous research outcomes
 - Provides a statistical link between knowledge from applied research and policy applications
 - Assumes primary research is a random sampling from an implied meta-valuation function
- Serves three purposes (Smith & Pattanayak, 2002)
 - Research synthesis;
 - Hypothesis testing; or
 - Benefit transfers

Meta-Analysis is on the Rise

"Meta-Analysis" Keyword Frequency



Accuracy of Benefit Transfers

■ Convergent Validity Testing

1. Estimate actual value for policy site
 - Primary data collection and analysis
2. Estimate transfer value for policy site
 - Benefit transfer method, or
 - Based on subsets of data in same study
3. Evaluate how close the transfer value from BT comes to the actual value

Convergent Validity Results

Source	Resource/Activity	Value Transfer Percent Error	Function Transfer Percent Error
Loomis (1992)	Recreation	4 – 39	1 – 18
Parsons & Kealy (1994)	Water/Recreation	4 – 34	1 – 75
Loomis et al. (1995)	Recreation		
Nonlinear Least Squares Model		---	1 – 475
Heckman Model		---	1 – 113
Bergland et al. (1995)	Water Quality	25 – 45	18 – 41
Downing & Ozuna (1996)	Fishing	0 – 577	---
Kirchhoff et al. (1997)	Whitewater Rafting	36 – 56	87 – 210
	Birdwatching	35 – 69	2 – 35
Kirchhoff (1998)	Recreation/Habitat		
Benefit Function Transfer		---	2 – 475
Meta-Analysis Transfer		---	3 – 7028
Brouwer & Spaninks (1999)	Biodiversity	27 – 36	22 – 40
Morrison & Bennett (2000)	Wetlands	4 – 191	---
Rosenberger & Loomis (2000a)	Recreation	---	0 – 319
VandenBerg et al. (2001)	Water Quality		
Individual Sites		1 – 239	0 – 298
Pooled Data		0 – 105	1 – 56
Shrestha & Loomis (2001)	Recreation	---	1 – 81

II. Three Sources of Error

- A. Generalization Error
- B. Measurement Error
- C. Publication Selection Bias

A. Generalization Error

- *Generalization error* is associated with applying estimates to sites for which they were not measured; i.e., generalizing values
- Magnitude of error is inversely related to the correspondence between the study site and policy site
 - Similarity of affected markets, the sites, spatial characteristics, and time

Site Correspondence Decreases Transfer Error

- Intra-State errors < Inter-State errors
 - Loomis (1992) – fishing in OR, WA, ID
 - VandenBerg et al. (2001) – groundwater quality in MA, PA, NY
- Intra-Regional errors < Inter-Regional errors
 - Loomis et al. (1995) – USACE reservoirs in TN, AR, CA
- Shared experience errors < No experience errors
 - VandenBerg et al. (2001) – groundwater quality – less error than intra-State, inter-State, or among inexperienced communities

Evidence: Adjusting Estimates

- Function transfer error < Value transfer error
 - Loomis (1992) – fishing in OR, WA, ID
 - Parsons & Kealy (1994) – lake recreation in WI
 - Bergland et al. (1995) – water quality in Norway
 - Kirchhoff et al. (1997) – birdwatching in AZ
 - Brouwer & Spaninks (1999) – biodiversity in the Netherlands
 - VandenBerg et al. (2001) – groundwater quality in MA, PA, NY
- However, few site/market (sample) characteristics were included in the transfer functions

B. Measurement Error

- Measurement of values requires researchers to make judgments and assumptions
 - Which data are relevant?
 - How should data be adjusted?
 - What estimators are appropriate?
 - How does the model fit the data?
- *Measurement error* arises when these decisions affect the transferability of estimates

Evidence of Measurement Error

- Moderator effects of different methods are statistically significant in meta-regression analyses
 - Rosenberger & Loomis (2001) – recreation use values meta
 - Valuation method
 - Elicitation method
 - Survey design
 - Units of measurement

Evidence of Measurement Error

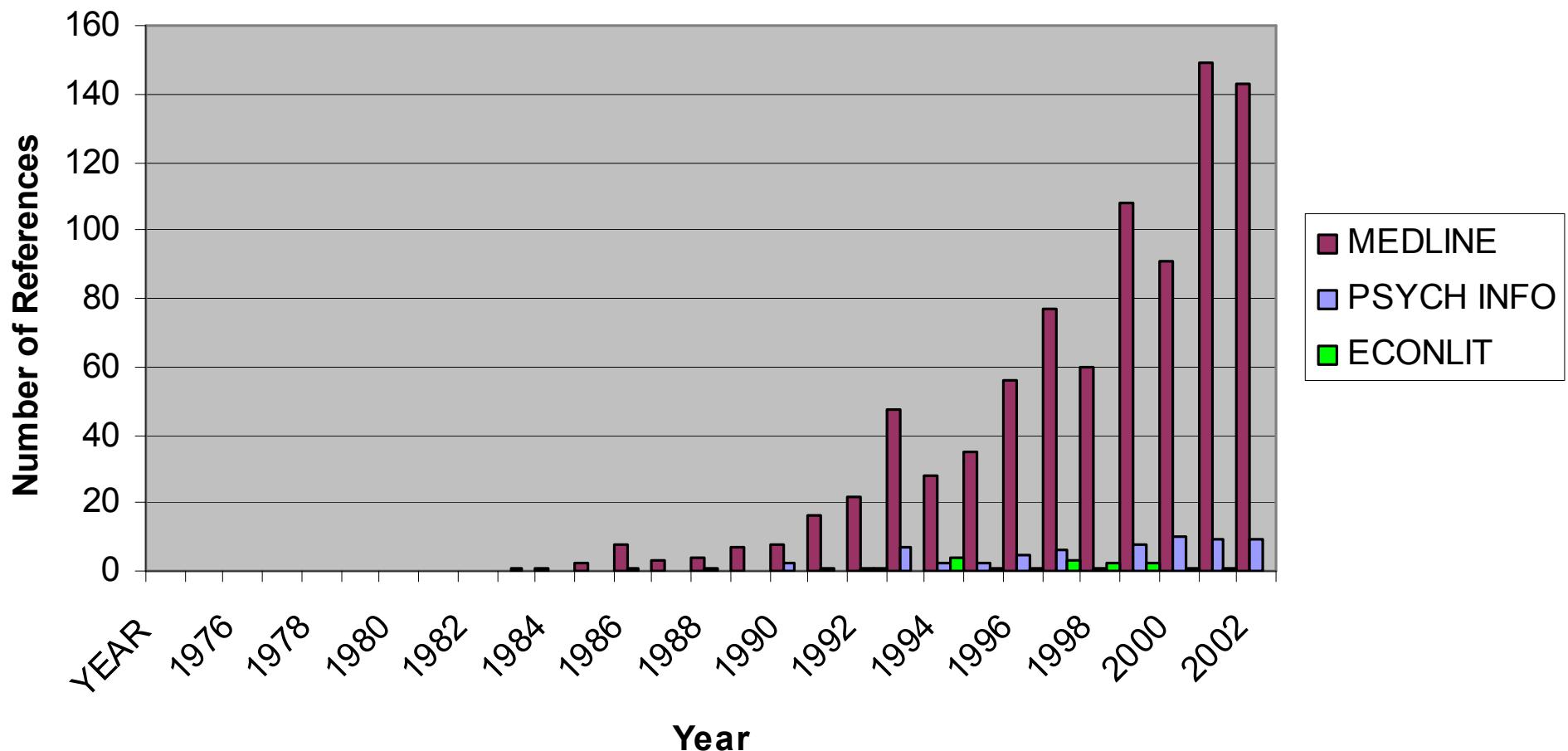
■ Access to information

- A good database is a necessary foundation for quality meta-analyses and benefit transfers
- Incomplete reporting of information may not be detrimental to original study, but compromises secondary analyses (Florax et al. 2002)
 - Rosenberger & Loomis (2000) – recreation use values database (131 studies; 682 estimates)
 - Income: 2.5% reporting
 - Education: 0.5% reporting
 - Age: 3.3% reporting
 - Gender: 16.0% reporting
 - Sample size: 61.0% reporting
- Meta transfer function tests did not include ability to adjust for market characteristics (Kirchhoff (1998); Rosenberger & Loomis (2000); Shrestha & Loomis (2001))

C. Publication Selection Bias

- *Publication selection bias* occurs when the literature is not a random sample of empirical evidence
 - Reporting only statistically significant results or results that conform to expectations
 - Not reporting statistically insignificant moderator effects
 - Building a database of only easily accessible and/or published research
- Caveats:
 - Some observable forms of measurement error may be induced by the peer-review process and desire to publish
 - Other forms of measurement error may masquerade as publication bias

"Publication Bias" Keyword Frequency



Publication Selection Bias

- Sources of publication selection bias (Card & Krueger, 1995: 239)
 - Reviewers and editors may be predisposed to accept papers consistent with conventional view;
 - Researchers may use the presence of conventionally expected results as a model selection test; and
 - Everyone may possess a predisposition to treat 'statistically significant' results more favorably

Publication Selection Bias

■ What motivates publishing?

- Most journals in the environmental economics field are not interested in new estimates of benefits for their own sake (Smith & Pattanayak, 2002: 273)
- May result in a set of selection criteria for the peer-review process that are insensitive to benefit transfer needs

Preliminary Evidence of Publication Selection Bias

■ Meta-regression dummy variable tests (publication type)

- Smith & Huang (1995) – air quality benefits via hedonic property
 - Significant: Published < Unpublished
- Woodward & Wui (2001) – wetland benefits
 - Not significant: Published < Unpublished
- Dalhuisen et al. (2003) – price and income elasticities for residential water demand
 - Price – Significant: Published > Unpublished (Published more negative)
 - Income – Significant: Published > Unpublished (Published more positive)
- Zelmer (2003) – voluntary contributions to public goods
 - Not significant: Published (journal) < Unpublished (working paper)
- Gallet & List (2003) – price and income elasticities for cigarette demand
 - Price – Significant: Premier (top 36) journals > Non-Premier journals (Premier more negative)
 - Income – Significant: Premier (top 36) journals > Non-Premier journals (Premier more positive)
- van Kooten (2004) – carbon sequestration costs in forestry
 - Significant: Peer-reviewed > No n-Peer-reviewed
- Rosenberger (2005) – recreation use benefits
 - Significant: Journal < Non-Journal

Preliminary Evidence of Publication Selection Bias

- Recreation Use Values Database
 - Benefit Estimates
 - a. By Source (all estimates)
 - Journal < Non-Journal
 - b. By Primary Contribution (restricted to journal publications)
 - Methodology-contribution > New Estimate-contribution
 - Range of Benefit Estimates (std errors)
 - a. By Source (all estimates)
 - Journal > Non-Journal
 - b. By Primary Contribution (restricted to journal publications)
 - Methodology-contribution > New Estimate-contribution

III. Recommendations

- Minimize error in benefit transfers
 - Improve access to empirical evidence (literature)
 - Improve recording and reporting on data and analysis
 - Promote publishing studies that focus on new estimates of value

Conclusions

- e-Journal for publishing new estimates of value
 - Link to active database (improved access)
 - No page limits (full reporting and recording of data)
 - Publish based on:
 - New estimates of value for their own sake
 - Research protocol or validity criteria
 - Peer-reviewed with benefit transfer in mind